VALVE-PAIRING AND STRATIGRAPHIC INTEGRITY IN COASTAL MIDDEN DEPOSITS

A Preliminary Study from the Seven Mile Creek Mound, Central Queensland

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INTRODUCTION

Conjoin analyses of stone artefacts have been employed to assess the stratigraphic integrity of rockshelter deposits in Australia (e.g. Richardson 1992). Paradoxically, no comparable studies are available for open coastal midden sites despite frequent reference to this site type as stratigraphically problematic. In this poster we present preliminary results of a conjoin (or valve-pairing) analysis of the bivalve *Anadara trapezia* (mud ark or Sydney cockle) excavated from the Seven Mile Creek Mound in central Queensland. Attributes for identifying probable conjoins were established through a study of 158 articulated *A. trapezia* specimens recovered from the Seven Mile Creek Mound. We demonstrate that although articulated *A. trapezia* exhibit considerable valve dimorphism, umbo length and weight reliably reduces the field of probable conjoins which can then be manually refitted for confirmation. A total of 56 conjoining valve-pairs were identified out of a total of 608 whole *A. trapezia* valves.

AIMS

- To establish reliable criteria for valve-pairing *A. trapezia* through an analysis of morphological attibutes of articulated specimens
- To apply these criteria to identify probable conjoins in an assemblage of unarticulated *A. trapezia* valves
- To manually refit probable conjoins for confirmation
- To assess results in terms of site integrity and formation processes

METHODS

1. *A. trapezia* (Fig. 1,2) was selected for this study for three reasons: (1) it is present in most dated sites in the region making this method potentially applicable to other assemblages (Ulm in press; Ulm & Lilley 1999); (2) it is present in tidal estuaries in the region making studies of live-collected specimens possible (Fig. 2); and, (3) individuals exhibit considerable morphological variability making it unlikely that valves will conjoin tightly unless they are from the same bivalve (Koike 1979)

2. A total of 158 articulated *A. trapezia* were plotted *in situ* during excavation of the Seven Mile Creek Mound. Five attributes were measured for each paired left and right valve: length, width, height, weight and umbo length (Fig. 1). Linear regressions of left vs right valve attributes showed that both umbo length and weight were strongly correlated in paired valves (Figs 3-7)

3. Whole unarticulated *A. trapezia* valves were separated from the excavated assemblage (n=608), with length, width, height, weight and umbo length measured for each valve. The 608 valves were sorted by umbo length, weight and side (left or right) in descending order and assigned an arbitrary identification number (1-608). Valve-pairs were identified by manually refitting successive right valves to left valves until a conjoin was identified. Refitting of an individual valve was abandoned after 10 attempted refits forward and backward from the valve's position on the descending size scale

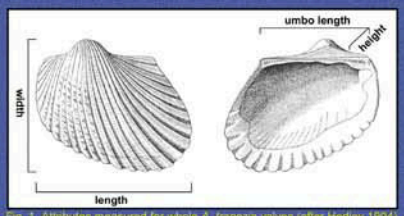

Fig. 1. Attributes measured for whole *A. trapezia* valves (after Hedley 1904).


Fig. 2. Live *A. trapezia*, Round Hill Creek.

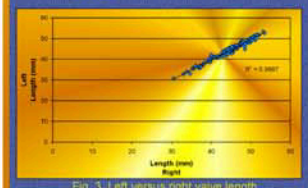
Fig. 3. Left versus right valve length.

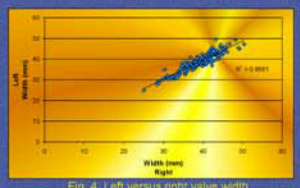
Fig. 4. Left versus right valve width.

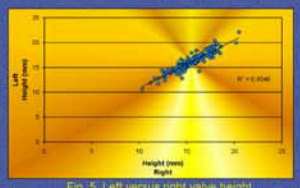
Fig. 5. Left versus right valve height.

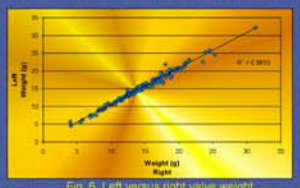
Fig. 6. Left versus right valve weight.

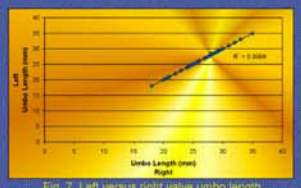
Fig. 7. Left versus right valve umbo length.

RESULTS

- 56 conjoins were identified out of a total of 608 whole *A. trapezia* valves, distributed between XU2-24 (Fig. 8)
- 79% of valve-pairs are vertically separated by less than 10cm, with 98% less than 20cm apart (Fig. 9). The relatively small distance separating valve-pairs supports the impression gained from the radiocarbon chronology that shell material accumulated during episode(s) of extremely rapid deposition (Fig. 8)
- The distribution of multiple conjoins indicate that the site can be divided into at least three separate major sequential accumulation events, separated by zones that are also possibly associated with these events (Fig. 8)

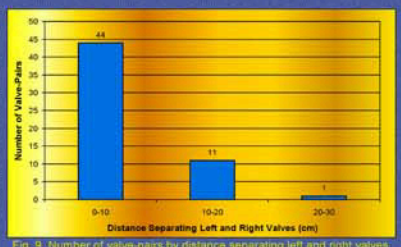

Fig. 9. Number of valve-pairs by distance separating left and right valves.

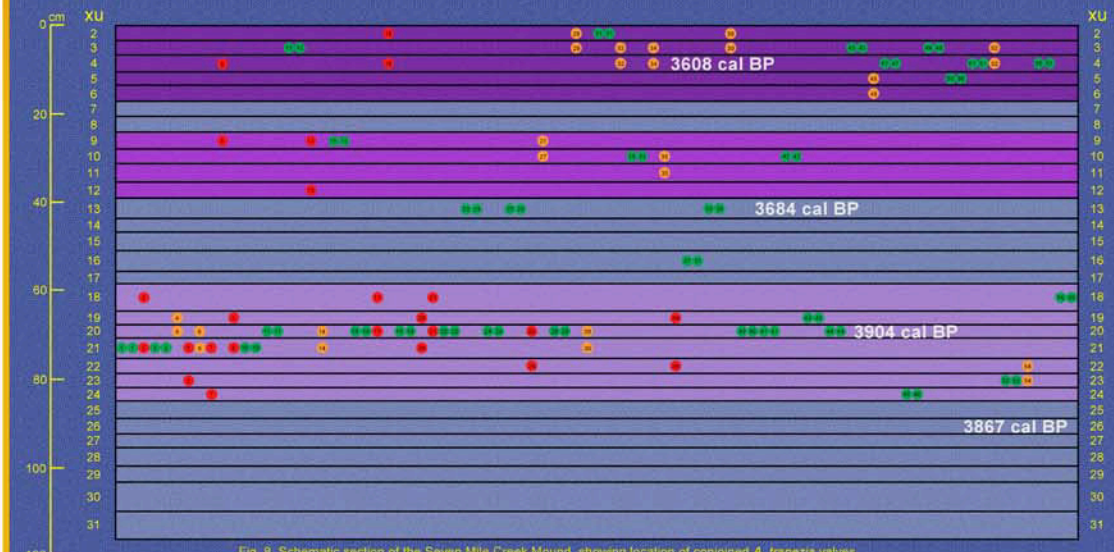

Fig. 8. Schematic section of the Seven Mile Creek Mound, showing location of conjoined *A. trapezia* valves.

CONCLUSIONS

- Reliable criteria were established which successfully identified conjoins among the unarticulated *A. trapezia* valves from the Seven Mile Creek Mound
- The small distances which separate the majority of valve-pairs attest to the stratigraphic integrity of the site and may indicate episodes of mound accumulation
- Future research will focus on applying these valve-pairing methods to other shell-dominated assemblages in the region to evaluate site integrity

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KEY
- Conjoin in a single XU
- Conjoin across adjacent XUs
- Conjoin separated by one or more XUs